

## CLAIMS

What is claimed is:

1. A harness for securing a first optical subassembly in a housing, wherein the housing has been previously designed to hold a second optical subassembly having a form factor different than the first optical subassembly, the harness comprising:

a harness body;

the harness body having an external surface adapted to conform with at least one surface feature on an interior of the housing, wherein an interface between the harness body and the surface feature on the interior of the housing secures the harness body from moving within the housing; and

the harness body forming a cavity adapted to conform with at least one surface feature on the first optical subassembly, wherein the interface between the harness body and the surface feature on the first optical subassembly secures the first optical subassembly from moving within the harness.

2. The harness of claim 1, wherein the cavity comprises at least one ridge which approximately matches the at least one surface feature of the first optical subassembly.

3. The harness of claim 1, wherein the harness comprises a first portion and a second portion.

4. The harness of claim 3, wherein the harness comprises a mechanism for coupling

the first portion to the second portion, wherein the mechanism comprises:

a first snap coupled to a first side face of the first portion, the first snap comprising a first lip;

a second snap coupled to a second side face of the first portion opposite to the first side face of the first portion, the second snap comprising a second lip;

a first opening at a first side face of the second portion, the first opening comprising a first ridge, wherein the first ridge is capable of engaging the first lip; and

a second opening at a second side face of the second portion, the second opening comprising a second ridge, wherein the second ridge is capable of engaging the second lip.

5. The harness of claim 3, wherein the first portion comprises a third opening traversing from a top face of the first portion to a bottom face of the first portion opposite to the top face of the first portion, wherein a post of the housing is capable of residing within the third opening.

6. The harness of claim 3, wherein the second portion comprises a fourth opening traversing from a top face of the second portion to a bottom face of the second portion opposite to the top face of the second portion, wherein a post of the housing is capable of residing within the fourth opening.

7. The harness of claim 3, further comprising a clip capable of engaging the first and second portions.

8. The harness of claim 7, wherein the clip comprises:

a first slanted surface coupled to a top face and a first side wall of the clip, wherein the first slanted surface is capable of abutting against a first slanted surface of the housing; and

a second slanted surface coupled to the top face and a second side wall of the clip opposite to the first side wall of the clip, wherein the second slanted surface is capable of abutting against a second slanted surface of the housing.

9. The harness of claim 8, wherein the clip further comprises:

a first protrusion coupled to a top face of the clip at a first end of the clip, wherein the first protrusion is capable of abutting against a first end face of the second portion;

a second protrusion coupled to the top face of the clip at a second end of the clip opposite to the first end of the clip, wherein the second protrusion is capable of abutting against a second end face of the second portion opposite to the first end face of the second portion;

a third protrusion coupled to a first side wall of the clip distal to the top face of the clip, wherein the third protrusion is capable of abutting against a bottom face of the first portion; and

a fourth protrusion coupled to a second side wall of the clip distal to the top face of the clip opposite to the first side face of the clip, wherein the fourth protrusion is capable of abutting against the bottom face of the first portion.

10. The harness of claim 8, wherein the clip further comprises at least one spring coupled to a top face of the clip.

11. The harness of claim 3, wherein the first portion further comprises a fifth opening at a second side face of the first portion proximate to the second feature, wherein a thermal electric cooler may reside within the fifth opening.

12. The harness of claim 11, wherein a thermal conductive material may further reside within the fifth opening.

13. The harness of claim 12, wherein a thermister may further reside within the fifth opening.

14. The harness of claim 3, further comprising:  
a first extension coupled to a first end face of the first portion; and  
a second extension coupled to a first end face of the second portion.

15. The harness of claim 14, wherein the first extension comprises at least one clip, the at least one clip comprising at least one lip, wherein the at least one lip is capable of engaging at least one connector.

16. The harness of claim 3, wherein the first portion comprises a front plate and the second portion comprises a back plate.

17. The harness of claim 16, wherein the front plate comprises at least one lip,  
wherein the back plate comprises at least one ridge, wherein the front plate is coupled to the back  
plate with an interference fit, wherein the at least one lip engages the at least one ridge.

18. The harness of claim 17, wherein the coupling of the front plate and the back plate  
provides electro-magnetic interference shielding.

19. The harness of claim 17, wherein the coupling of the front plate and the back plate  
secures the first optical subassembly in place independent of the housing.

20. The harness of claim 3, wherein the coupling of the first and second portions form  
a first cavity and a second cavity, wherein a transmitting optical subassembly (TOSA) resides  
within the first cavity, wherein a receiving optical subassembly (ROSA) resides with the second  
cavity.

21. The harness of claim 20, wherein the first portion can be physically separated  
from the second portion.

22. The harness of claim 1, wherein the second optical subassembly comprises a non-  
grating stabilized laser, wherein the first optical subassembly comprises a grating stabilized laser.

23. The harness of claim 22, wherein the harness body is longer than the second

optical subassembly, wherein the cavity receives at least a portion of the laser of the grating stabilized laser.

24. The harness of claim 1, wherein the harness body is configured to maintain substantially the same electro-magnetic interference, thermal, and electrical properties substantially independent of the shape of the cavity and form factor of the optical subassembly.

25. A harness for retrofitting optical subassemblies in an optical assembly housing, comprising:

(a) a first portion capable of residing within the optical assembly housing, the first portion comprising:

(a1) a first feature in which a first subassembly may reside, the first feature comprising a first mechanism for substantially constraining the first subassembly in at least one degree of freedom, and

(a2) a second feature in which a second subassembly may reside, the second cavity comprising a second mechanism for substantially constraining the second subassembly in at least one degree of freedom; and

(b) a second portion capable of residing within the optical assembly housing, the second portion comprising:

(b1) a third feature in which the first subassembly may reside, the third feature comprising a third mechanism for substantially constraining the first subassembly in at least one degree of freedom, and

(b2) a fourth feature in which the second subassembly may reside, the fourth feature comprising a fourth mechanism for substantially constraining the second subassembly in at least one degree of freedom,

wherein when the first subassembly resides in the first and third features, and when the second subassembly resides in the second and fourth features, the first and second subassemblies are substantially constrained in six degrees of freedom.

26. The harness of claim 25, wherein the first, second, third, or fourth feature comprises a cavity.

27. The harness of claim 25, wherein the first or third features comprises at least one ridge which approximately matches at least one ridge of the first subassembly.

28. The harness of claim 25, wherein the second or fourth features comprises at least one ridge which approximately matches at least one ridge of the second subassembly.

29. The harness of claim 25, wherein the first or second feature traverses the first portion from a first end face of the first portion to a second end face of the first portion opposite to the first end face of the first portion.

30. The harness of claim 25, wherein the third or fourth feature traverses the second portion from a first end face of the second portion to a second end face of the second portion

opposite to the first end face of the second portion.

31. The harness of claim 25, further comprising a mechanism for coupling the first portion to the second portion, wherein the first subassembly and the second subassembly are substantially constrained in the six degrees of freedom when the first and second portions are coupled.

32. The harness of claim 31, wherein the mechanism for coupling comprises:  
a first snap coupled to a first side face of the first portion, the first snap comprising a first lip;  
a second snap coupled to a second side face of the first portion opposite to the first side face of the first portion, the second snap comprising a second lip;  
a first opening at a first side face of the second portion, the first opening comprising a first ridge, wherein the first ridge is capable of engaging the first lip; and  
a second opening at a second side face of the second portion, the second opening comprising a second ridge, wherein the second ridge is capable of engaging the second lip.

33. The harness of claim 25, wherein the first portion further comprises a third opening traversing from a top face of the first portion to a bottom face of the first portion opposite to the top face of the first portion, wherein a post of the housing is capable of residing within the third opening.



34. The harness of claim 25, wherein the second portion further comprises a fourth opening traversing from a top face of the second portion to a bottom face of the second portion opposite to the top face of the second portion, wherein a post of the housing is capable of residing within the fourth opening.

35. The harness of claim 25, further comprising:  
a third ridge coupled to a top face of the first portion; and  
a first indentation at the bottom face of the second portion, wherein the third ridge is capable of residing within the first indentation.

36. The harness of claim 25, further comprising:  
a second indentation at a first side face of the first portion;  
a third indentation at a second side face of the first portion opposite to the first side face of the first portion;  
a fourth indentation at a first side face of the second portion; and  
a fifth indentation at a second side face of the second portion opposite to the first side face of the first portion, wherein a first protrusion of the housing may reside within the second and fourth indentations, wherein a second protrusion of the housing may reside within the third and fifth indentations.

37. The harness of claim 25, further comprising:  
a fifth opening at the first feature;

a sixth opening at the second feature;  
a seventh opening at the third feature; and  
an eighth opening at the fourth feature, wherein the fifth, sixth, seventh, and eighth openings assist in heat dissipation of the first or second subassemblies.

38. The harness of claim 25, further comprising a clip capable of engaging the first and second portions.

39. The harness of claim 38, wherein the clip comprises:  
a first slanted surface coupled to a top face and a first side wall of the clip, wherein the first slanted surface is capable of abutting against a first slanted surface of the housing; and  
a second slanted surface coupled to the top face and a second side wall of the clip opposite to the first side wall of the clip, wherein the second slanted surface is capable of abutting against a second slanted surface of the housing.

40. The harness of claim 38, wherein the clip further comprises:  
a third protrusion coupled to a top face of the clip at a first end of the clip, wherein the third protrusion is capable of abutting against a first end face of the second portion;  
a fourth protrusion coupled to the top face of the clip at a second end of the clip opposite to the first end of the clip, wherein the fourth protrusion is capable of abutting against a second end face of the second portion opposite to the first end face of the second portion;  
a fifth protrusion coupled to a first side wall of the clip distal to the top face of the clip,

wherein the fifth protrusion is capable of abutting against a bottom face of the first portion; and  
a sixth protrusion coupled to a second side wall of the clip distal to the top face of the clip  
opposite to the first side face of the clip, wherein the sixth protrusion is capable of abutting  
against the bottom face of the first portion.

41. The harness of claim 38, wherein the clip further comprises at least one spring  
coupled to a top face of the clip.

42. The harness of claim 25, wherein the first portion further comprises a ninth  
opening at a second side face of the first portion proximate to the second feature, wherein a  
thermal electric cooler may reside within the ninth opening.

43. The harness of claim 42, wherein a thermal conductive material may further reside  
within the ninth opening.

44. The harness of claim 43, wherein a thermister may further reside within the ninth  
opening.

45. The harness of claim 25, further comprising:  
a first extension coupled to a first end face of the first portion; and  
a second extension coupled to a first end face of the second portion.

46. The harness of claim 45, wherein the first extension comprises at least one clip,  
the at least one clip comprising at least one lip, wherein the at least one lip is capable of engaging  
at least one connector.

5 47. The harness of claim 1, wherein the first portion comprises a front plate, wherein  
the second portion comprises a back plate.

10 48. The harness of claim 47, wherein the front plate comprises at least one lip,  
wherein the back plate comprises at least one ridge, wherein the front plate is coupled to the back  
plate with an interference fit, wherein the at least one lip engages the at least one ridge.

15 49. A harness for retrofitting optical subassemblies in an optical assembly housing,  
comprising:

a first feature, wherein a first subassembly may reside within the first feature, wherein a  
size of the first feature is smaller than a size of the first subassembly, wherein when the first  
subassembly resides within the first feature, the first subassembly is substantially constrained in  
six degrees of freedom by interference; and

20 a second feature, wherein a second subassembly may reside within the second feature,  
wherein a size of the second feature is smaller than a size of the second subassembly, wherein  
when the second subassembly resides within the second feature, the second subassembly is  
substantially constrained in six degrees of freedom by interference.

50. A method of manufacturing a harness for securing a first optical subassembly and a second optical subassembly in a housing, wherein the first and second optical subassemblies have different form factors, the method comprising:

providing a first mold which defines external features of the harness which interface with an interior surface of the housing;

providing a second mold which defines internal features of the harness which interface with an exterior surface of the first optical subassembly;

using the first mold and the second mold to create the harness for securing the first optical subassembly in the housing;

providing a third mold which defines internal features of the harness which interface with the exterior surface of the second optical subassembly; and

using the first mold and the third mold to create the harness for securing the second optical subassembly in the housing.